Short Answer:

Answer the following questions with complete sentences in your own words. You are encouraged to conduct your own research online or through other methods before answering the questions. If you research online, please consult multiple sources before you write down your answers. You are expected to be able to explain your answers in detail (Provide examples for each question).

1. What is data modeling? Why do we need it? When would you need it?
2. What is an entity? What is an attribute? What is a tuple? What is a Domain?
3. What is a super key? Give an example of a superkey that is not a candidate key and explain why.
4. What is the primary key? How is it different from a unique key?
5. What are the relationships in data modeling?
6. What is cardinality in data modeling? What are the different types of cardinalities? Give an example for each type.
7. What are composite attributes, multi-valued attributes, and derived attributes? Give at least one example for each type of attribute that is not in the course material.
8. How do you represent a many-to-many relationship in a database? Please describe in detail using an example.
9. What is normalization? Why do you need to normalize?
10. What does data redundancy mean? How is it different from duplication? Can you give an example of each?
11. What are the different types of dependencies? How are they different? Give an example of each type.
12. What are normal forms? Which normal forms are most common?
13. What is database integrity? Why do you need it? Provide an example of user-defined integrity.
14. What is a relational database? What is a non-relational database? Difference? When would you choose a relational or non-relational database?
15. What is DDL? What are the major statements in DDL?
16. What is DML? What are the major statements in DML?

17. How do you insert values into a table if you don’t know the order of the columns?
18. How is truncate different from delete?
19. Is syntax in SQL case sensitive?
20. What is the order of different clauses in a select statement when you write it?
21. What are constraints? Why do we need them? Are they mandatory to have?
22. How do you make sure there are no duplicate values in a column?
23. How many ways can you add constraints to a table? How are they different?

Coding Questions:

Write code in c# to solve the following problems. Please write your own answers. You are highly encouraged to present more than one way to answer the questions. Please follow best practices when you write the code so that it is easily readable, maintainable, and efficient. Clearly state your assumptions if you have any. You may discuss with others on the questions, but please write your own code.

1. Please show the tables in their 1NF, 2NF, and 3NF.

PET ID	PET NAME	PET TYPE	PET AGE	OWNER	VISIT DATE	PROCEDURE
246	ROVER	DOG	12	SAM COOK	JAN 13/2002	01 – RABIES VACCINATION
					MAR 27/2002	10 – EXAMINE and TREAT WOUND
					APR 02/2002	05 – HEART WORM TEST
298	SPOT	DOG	2	TERRY KIM	JAN 21/2002	08 – TETANUS VACCINATION
					MAR 10/2002	05 – HEART WORM TEST
341	MORRIS	CAT	4	SAM COOK	JAN 23/2001	01 – RABIES VACCINATION
					JAN 13/2002	01 – RABIES VACCINATION
519	TWEEDY	BIRD	2	TERRY KIM	APR 30/2002	20 – ANNUAL CHECK UP
					APR 30/2002	12 – EYE WASH

2. We would like to design a database to maintain information about hospital staff, including doctors and nurses, and patients at the hospital. The information we need includes

a. Staff, including their names, addresses, and social security numbers.
b. Patients, including their names, addresses, and the name of their insurance company.
c. Patients are each assigned to a ward (room).
d. The staff that are nurses are assigned to zero or more wards. Each ward has at least one nurse assigned.
e. The staff that are doctors are assigned to zero or more patients. Patients may or may not have a doctor assigned, and they may have more than one doctor.
f. Patients in the same ward may have different doctors but will always have the same nurse(s). Please design the ERD.

3. Read the README file from adventureworks. And create the database in SSMS.
a) Return all columns and data regarding employees only
b) Return all the names of customer in adventureworks (all 3
columns)
c) List all customers whose first name is Eugene.

4. According to your answer to question 1, create tables. Populate at least three tables with data. Make sure to use different methods to populate tables. Write a query to delete all Owners whose first name is ‘Sam’.

*Submit all your SQL files including those used for inserting data.